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Chang

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[54] **MULTI-SECTIONAL CENTRIFUGAL BLOWER FAN UNIT**

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[51] **Int. Cl.**[5] **B63H 1/26**

[52] **U.S. Cl.** ..... **416/178**; 416/187; 416/204 R

[58] **Field of Search** ..... 416/178, 187, 204 R, 416/207, 213 R, 214 R

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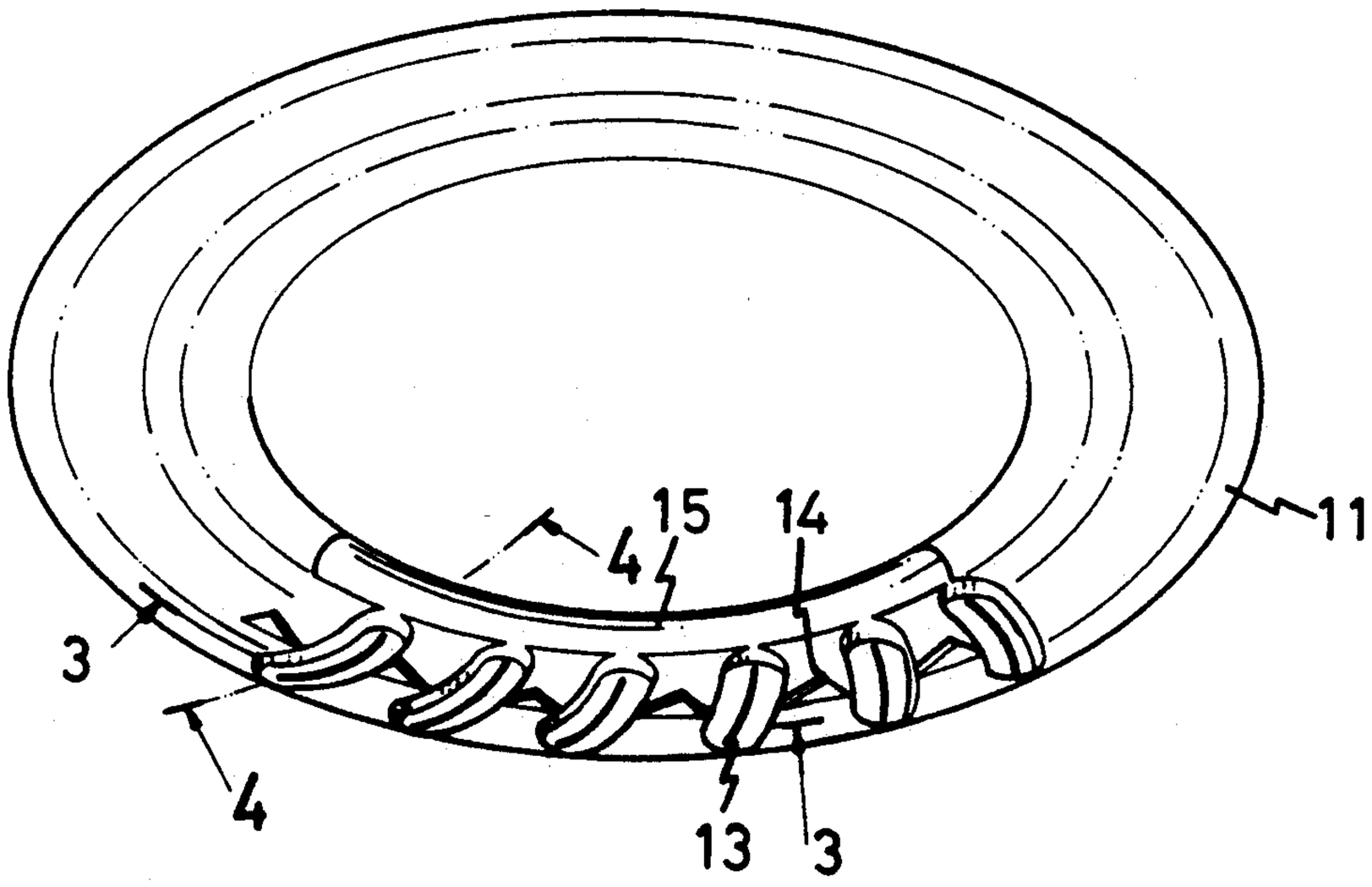
[57] **ABSTRACT**

A centrifugal fan assembly consisting of a number of centrifugal fan units. Each of the centrifugal fan units comprises (a) an annular member with a first side and a second side, (b) a number of blades integrating with and extending from said first side, (c) a number of grooves formed in said second side of said annular member, (d) a first device for guiding said blades formed on one centrifugal fan unit to enter in said grooves formed in another centrifugal fan unit even if there is a slight circumferential misalignment of said blades formed on one centrifugal fan unit between said grooves formed in another centrifugal fan unit and (e) a second device for guiding said blades formed on one centrifugal fan unit to enter in said grooves formed in another centrifugal fan unit even if there is a slight radial misalignment of said blades formed on one centrifugal fan unit between said grooves formed in another centrifugal fan unit.

5 Claims, 9 Drawing Sheets



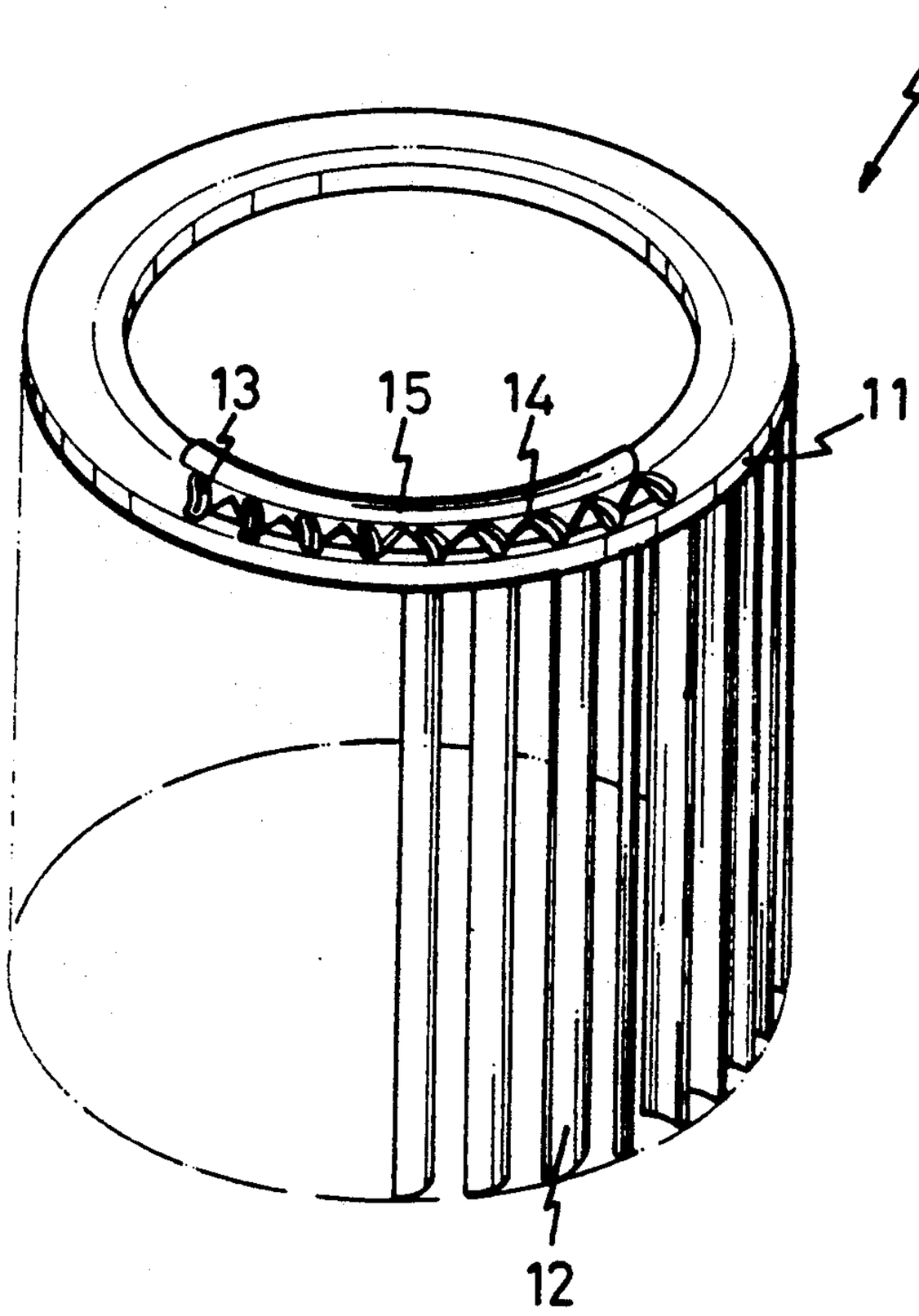


FIG. 1

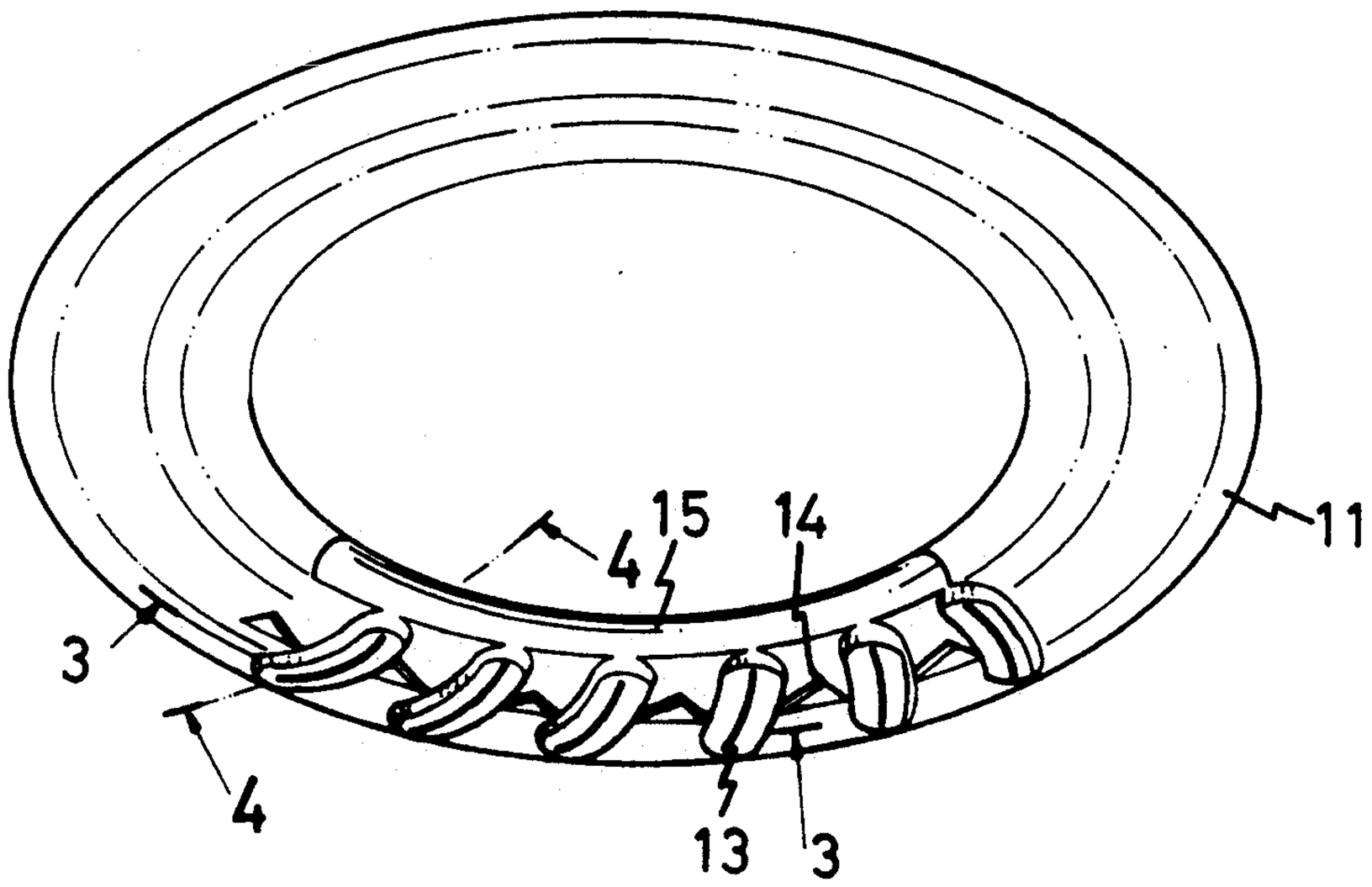


FIG. 2

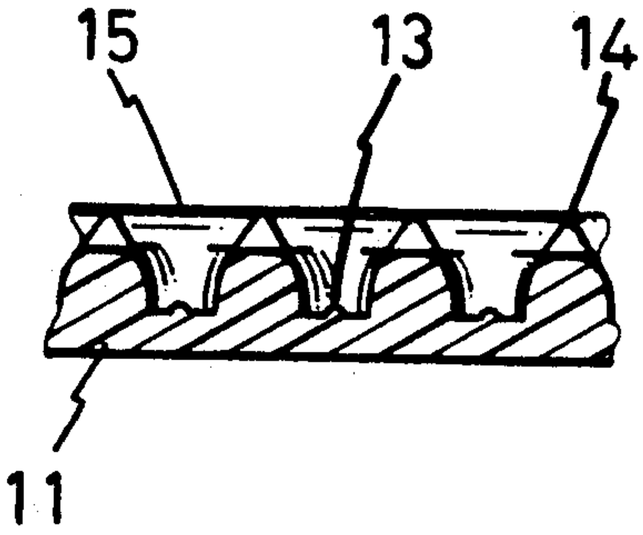


FIG. 3

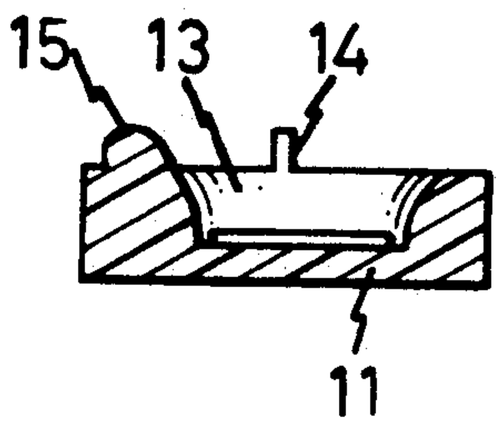


FIG. 4

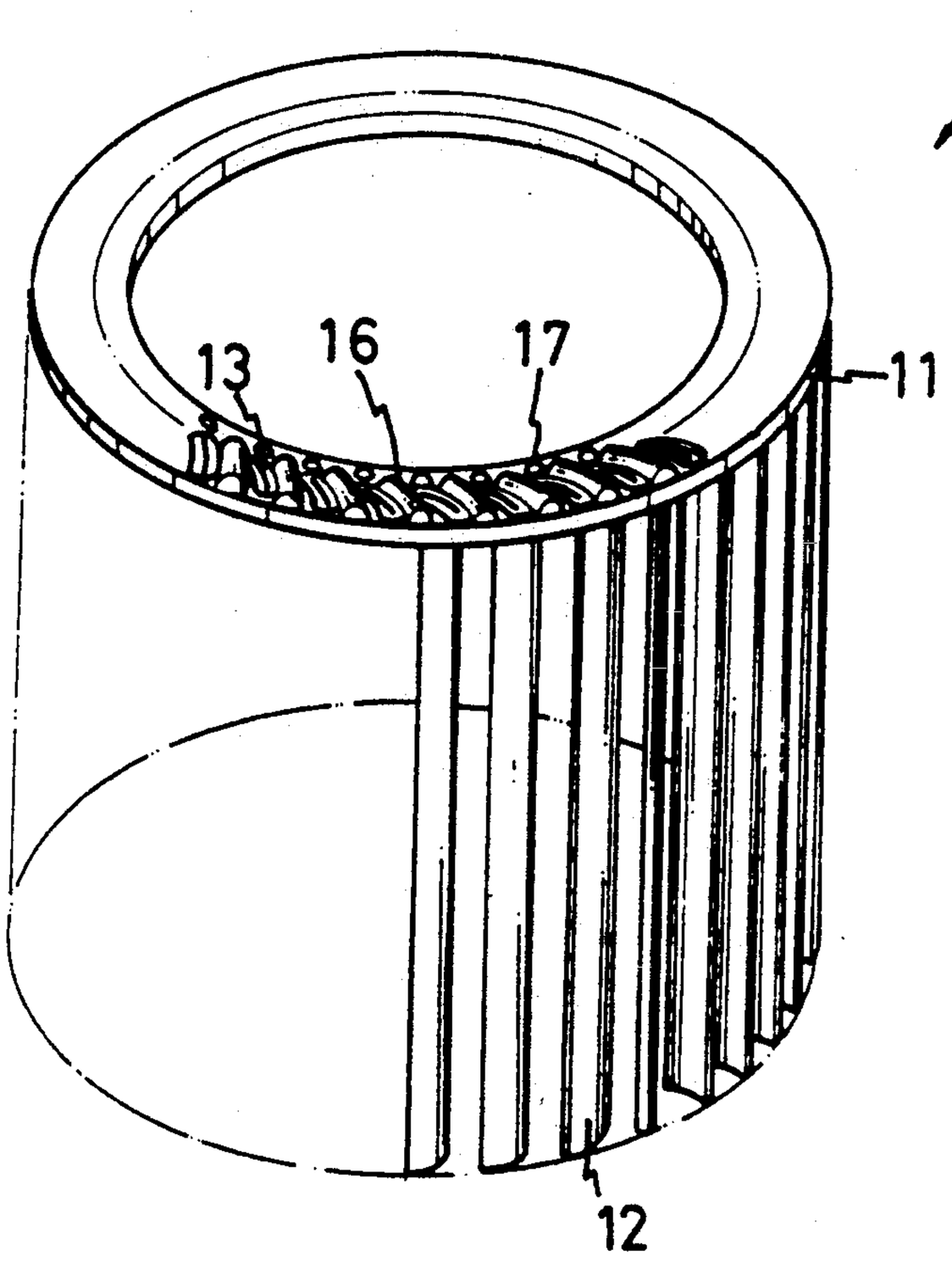


FIG. 5

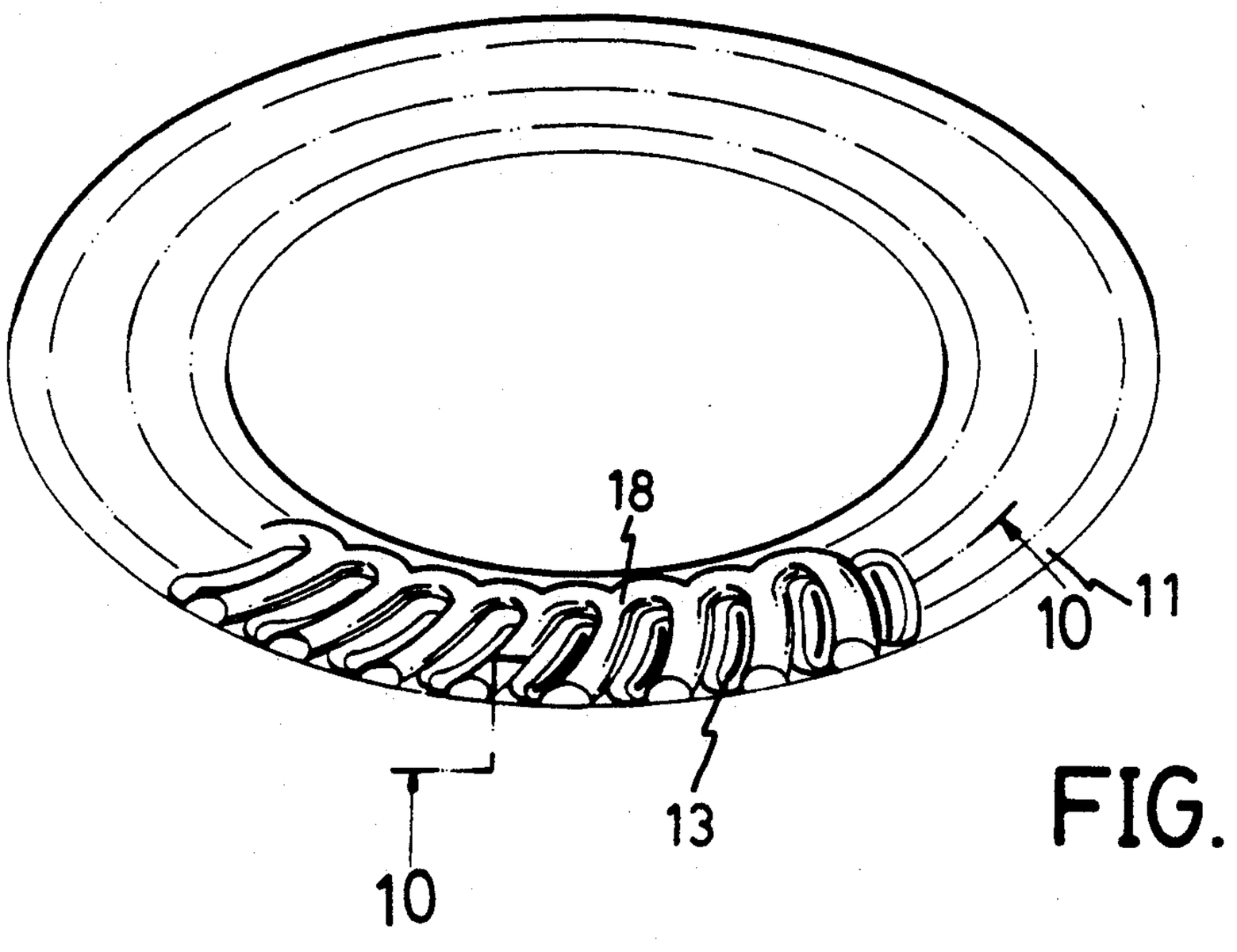


FIG. 9

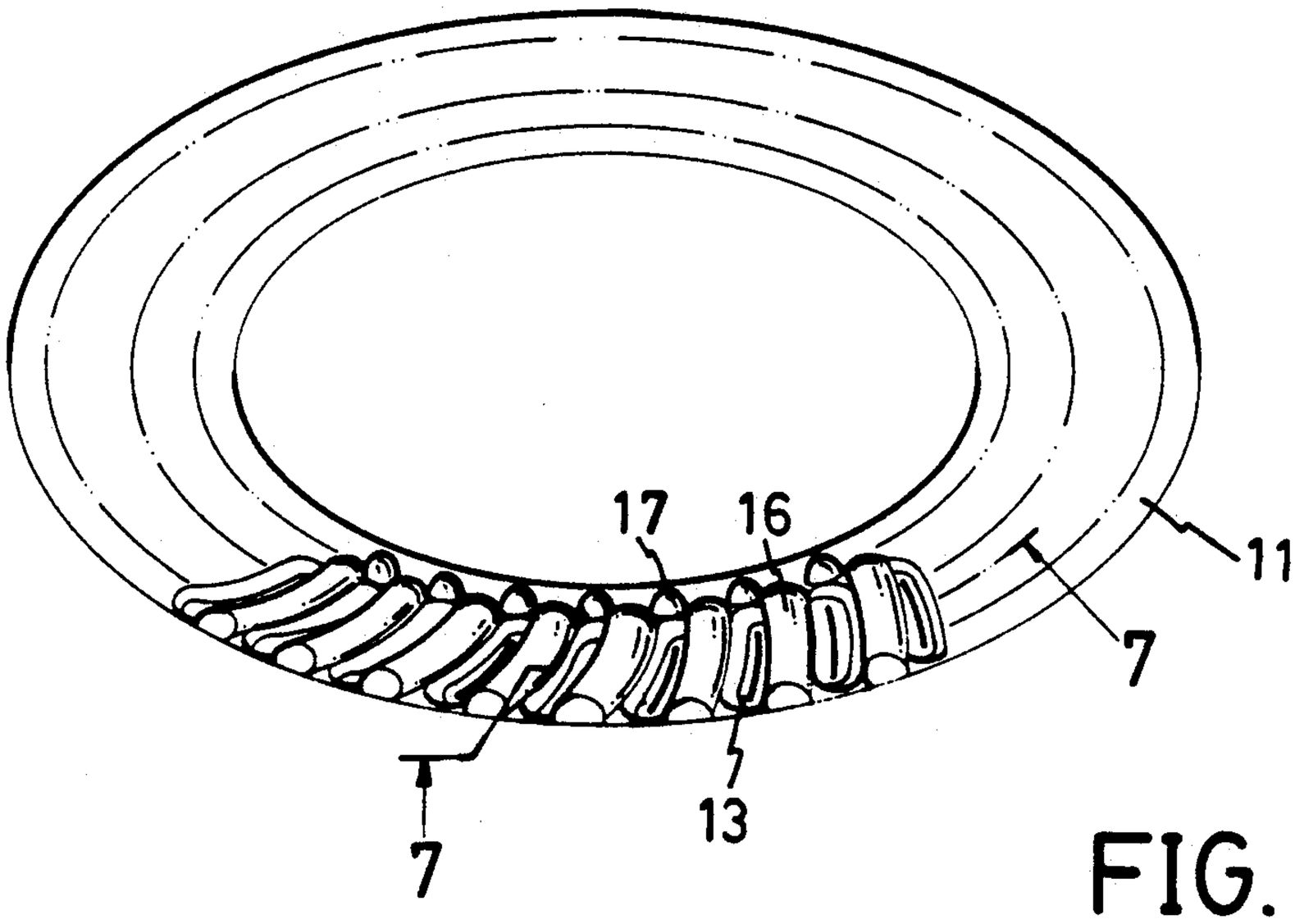


FIG. 6

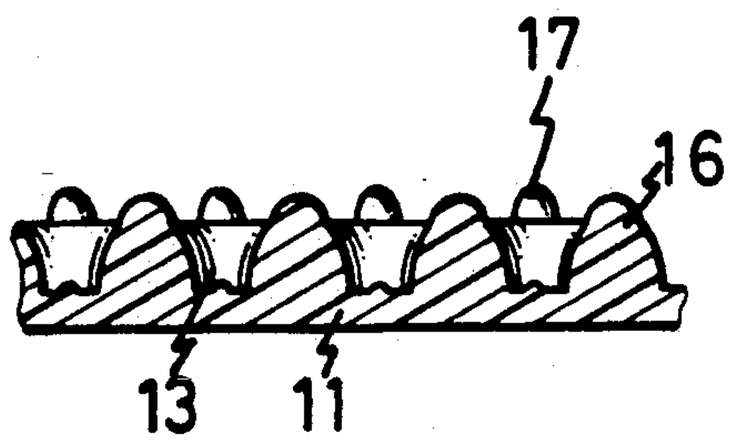


FIG. 7

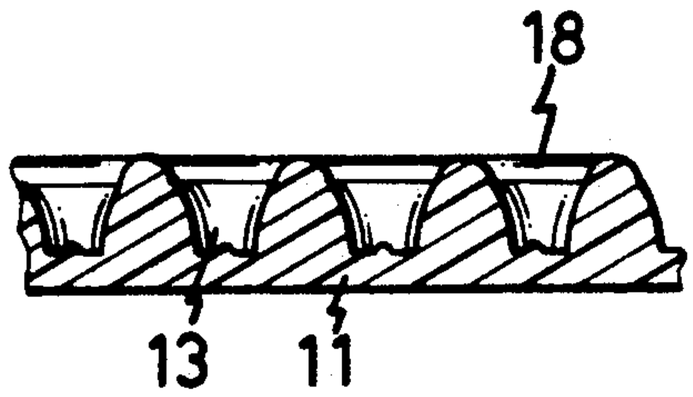


FIG. 10

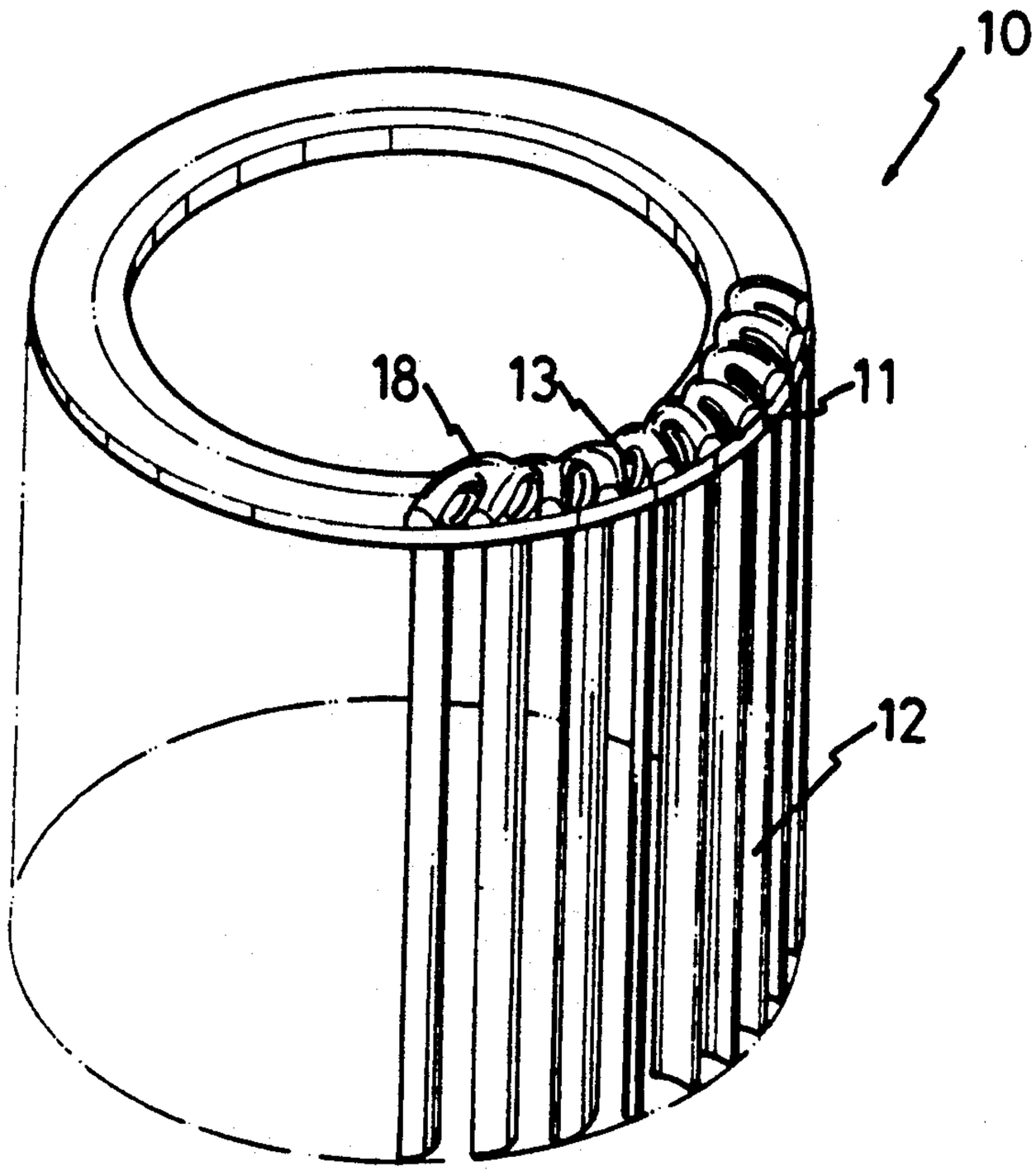


FIG. 8

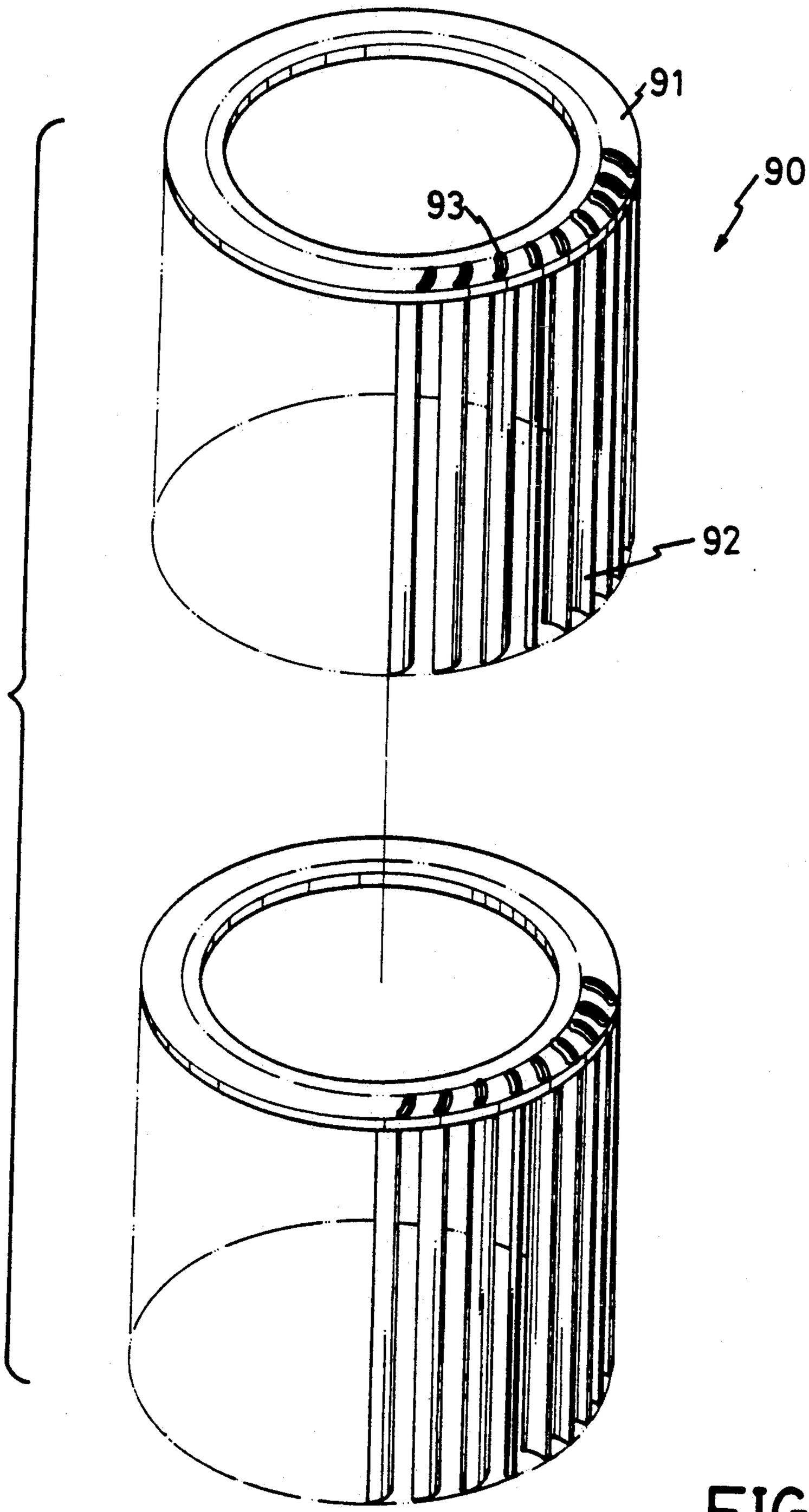


FIG. 11
PRIOR ART

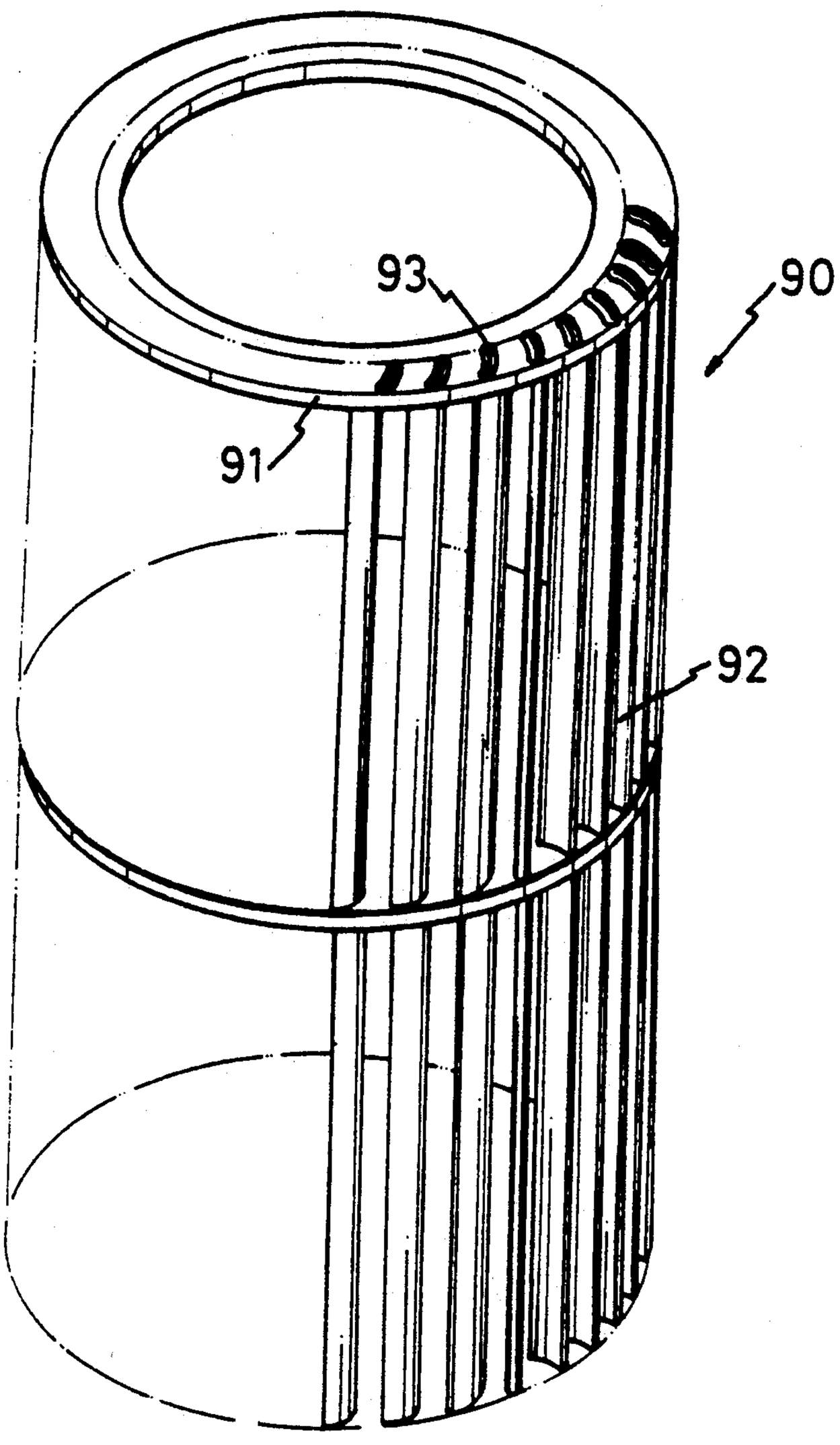


FIG. 12
PRIOR ART

MULTI-SECTIONAL CENTRIFUGAL BLOWER FAN UNIT

BACKGROUND OF INVENTION

1. Field of Invention

The present invention relates to a multi-sectional centrifugal blower fan unit .

2. Related Prior Art

Conventionally, centrifugal sets are used for air conditioners. Each centrifugal set consists of a number of units dependent on the desired length thereof. However, it is difficult to combine those units. Therefore, the present invention is intended to solve the above-mentioned problem.

SUMMARY OF INVENTION

It is an object of the present invention to provide a multi-sectional centrifugal blower fan unit.

For a better understanding of the present invention and objects thereof, a study of the detailed description of the embodiments described hereinafter should be made in relation to the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view of a centrifugal fan unit in accordance with a first embodiment of the present invention;

FIG. **2** is a perspective view of an annular member of a centrifugal fan unit in accordance with a first embodiment of the present invention;

FIG. **3** is a vertical cross-sectional view taken along a line **3—3** in FIG. **2**;

FIG. **4** is a vertical cross-sectional view taken along a line **4—4** in FIG. **2**;

FIG. **5** is a perspective view of a centrifugal fan unit in accordance With a second embodiment of the present invention;

FIG. **6** is a perspective view of an annular member of a centrifugal fan unit in accordance with a second embodiment of the present invention;

FIG. **7** is a vertical cross-sectional view taken along a line **7—7** in FIG. **6**;

FIG. **8** is a perspective view of a centrifugal fan unit in accordance with a third embodiment of the present invention;

FIG. **9** is a perspective view of an annular member of a centrifugal fan unit in accordance with a second embodiment of the present invention;

FIG. **10** is a vertical cross-sectional view taken along a line **10—10** in FIG. **9**;

FIG. **11** is a perspective view of two centrifugal fan units before combination thereof in accordance with prior art; and

FIG. **12** is a perspective view of a centrifugal fan set consisting of two centrifugal fan units in accordance with prior art.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention will be described in detail with reference to FIGS. **1–10** illustrating preferred embodiments of the present invention.

However, a centrifugal fan set consisting of two centrifugal fan units in accordance with prior art will be described with reference to FIGS. **11** and **12** in priority for better understanding of the features and advantages of the present invention.

Referring to FIG. **11**, two separate centrifugal fan units **90** are shown. Each of the centrifugal fan units **90** consists of an annular member **91**, a number of blades **92** and a number of grooves **93**. The annular member **91** has a first side and a second side. The blades **92** integrate with and extend from the first side of the annular member **91**. The grooves **93** are formed in the second side of the annular member **91**. The free ends of the blades **92** formed on one of the centrifugal fan units **90** are firmly received in the grooves **93** formed in the remaining of the centrifugal fan units **90** by appropriate means, heating or adhesion. The free ends of the blades **92** formed on one of the centrifugal fan units **90** must be sited in the grooves **93** formed in the remaining of the centrifugal fan units **90** at the same time. It is very time-consuming to do that as the grooves **93** are narrow. The present invention provides a centrifugal fan unit which can be combined more easily.

The present invention will be described in detail with reference to FIGS. **1–10** illustrating preferred embodiments thereof.

Initially referring to FIG. **1** illustrating a first embodiment of the present invention, a centrifugal fan unit **10** consists of an annular member **11** with a first side and a second side. A number of blades **12** integrate with and extend from the first side of the annular member **11**.

Additionally referring to FIG. **2**, the improvement of the present invention over prior art is about the annular member **11**. A number of grooves **13** are formed in the second side of the annular member **11**. A number of guides **14** are formed on the second side of the annular member **11**. An annular guide **15** is formed on the second side of the annular member **11**, along an inner edge.

Additionally referring to FIG. **3**, the grooves **13** and the guides **14** are alternatively arranged. Each of the guides **14** has a triangular configuration with two inclined rims. The inclined rims of the guides **14** permit the blades **12** formed on one centrifugal fan unit **10** to enter in the grooves **13** formed in another centrifugal fan unit **10** even if there is a slight circumferential misalignment of the blades **12** with the grooves **13**.

Referring to FIG. **4**, the annular guide **15** has an inclined side permitting the blades **12** formed on one centrifugal fan unit **10** to enter in the grooves **13** formed in another centrifugal fan unit **10** even if there is a slight radial misalignment of the blades **12** with the grooves **13**.

Referring to FIG. **5** illustrating a second embodiment of the present invention, a centrifugal fan unit **10** consists of an annular member **11** with a first side and a second side. A number of blades **12** integrate with and extend from the first side of the annular member **11**.

Additionally referring to FIG. **6**, a number of grooves **13** are formed in the second side of the annular member **11**. A number of guides **16** are formed on the second side of the annular member **11**. A number of guides **17** are formed on the second side of the annular member **11**.

Additionally referring to FIG. **7**, the grooves **13** and the guides **16** are alternatively arranged. Each of the guides **16** has a cylindrical configuration with two inclined sides. The inclined sides of the guides **14** permit the blades **12** formed on one centrifugal fan unit **10** to enter in the grooves **13** formed in another centrifugal fan unit **10** even if there is a slight circumferential misalignment of the blades **12** with the grooves **13**.

Each of the guides **17** has a semi-spherical configuration. The guides permit the blades **12** formed on one centrifugal fan unit **10** enter in the grooves **13** formed in another centrifugal fan unit **10** even if there is a slight radial misalignment of the blades **12** with the grooves **13**.

Referring to FIG. **8** illustrating a third embodiment of the present invention, a centrifugal fan unit **10** consists of an annular member **11** with a first side and a second side. A number of blades **12** integrate with and extend from the first side of the annular member **11**.

Additionally referring to FIG. **9**, a number of grooves **13** are formed in the second side of the annular member **11**. A guide **18** is formed on the second side of the annular member **11**. The guide **18** has a substantially circumferential portion and a number of substantially radial portions integrating with and extending from the substantially circumferential portion. In other words, the guide **18** can be deemed as the combination of the annular guide **15** in accordance with the first embodiment of the present invention and the guides **16** in accordance with the second embodiment of the present invention.

Additionally referring to FIG. **10**, the grooves **13** and the substantially radial portions of the guide **18** are alternatively arranged. Each of the substantially radial portions of the guide **18** has two inclined sides permitting the blades **12** formed on one centrifugal fan unit **10** to enter in the grooves **13** formed in another centrifugal fan unit **10** even if there is a slight circumferential misalignment of the blades **12** with the grooves **13**.

The substantially circumferential portion of the guide **18** has an inclined side for permitting the blades **12** formed on one centrifugal fan unit **10** to enter in the grooves **13** formed in another centrifugal fan unit **10** even if the blades **12** slightly radially misalign with the grooves **13**.

The configurations of the guides.

While the present invention has been explained in relation to its preferred embodiment, it is to be understood that variations thereof will be apparent to those skilled in the art upon reading this specification. Therefore, the present invention is intended to cover all such variations as shall fall within the scope of the appended claims.

I claim:

1. A multi-sectional centrifugal blower fan unit comprising a plurality of sectional centrifugal blower fans;

each of said sectional centrifugal blower fans having an annular member with a first side and a second side,

a number of blades integrating with an extending from said first side,

a number of grooves in said second side of said annular member,

a first guiding mean formed on said second side of said annular member,

a second guiding means formed on said second side of said annular member,

wherein said first and said second guiding means assist said blades to enter said grooves even though one of said sectional centrifugal blower fan blades are slightly misaligned with said grooves formed on the other sectional centrifugal blower fan when said centrifugal blower fans are assembled together.

2. A centrifugal fan unit in accordance with claim **1**, wherein said first guiding means comprises a number of triangular guides each having two inclined rims and said grooves triangular guides are alternatively arranged.

3. A centrifugal fan unit in accordance with claim **1**, wherein said first guiding means comprises a number of substantially radially extending guides each having two inclined sides, and said grooves are alternatively arranged.

4. A centrifugal fan unit in accordance with claim **1**, wherein said second guiding means comprises an annular guides formed on said second side of said annular member.

5. A centrifugal fan unit in accordance with claim **1**, wherein said first guiding means comprises a number of guides formed on said second side of said annular member.

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